

CLIPPEDIMAGE= JP354113020A

PAT-NO: JP354113020A

DOCUMENT-IDENTIFIER: JP 54113020 A

TITLE: MANUFACTURING METHOD OF ROTOR OF STEP MOTOR

PUBN-DATE: September 4, 1979

INVENTOR-INFORMATION:

NAME

MIYAKE, KENJI

NOMURA, HIRONORI

ASSIGNEE-INFORMATION:

NAME

CITIZEN WATCH CO LTD

COUNTRY

N/A

APPL-NO: JP53020132

APPL-DATE: February 23, 1978

INT-CL (IPC): H02K021/08;H02K015/02

US-CL-CURRENT: 29/598

ABSTRACT:

PURPOSE: To reduce the size without making a through-hole in the rotor by securing the rotor through a zig and adhering the shaft from both side.

CONSTITUTION: The rotor 8 is secured through a zig and the adhesives is dripped on both sides. Then a rotor shaft 7 formed with a pinion 7a is adhered to the lower face of rotor while the large diameter section 6a of rotor shaft 6 is engaged coaxially with said rotor shaft, and dry hardened in a dryer furnace.

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CLIPPEDIMAGE= JP356110469A

PAT-NO: JP356110469A

DOCUMENT-IDENTIFIER: JP 56110469 A

TITLE: MANUFACTURE OF ROTOR OF STEP MOTOR FOR WATCH

PUBN-DATE: September 1, 1981

INVENTOR-INFORMATION:

NAME

NOMURA, HIRONORI

ASSIGNEE-INFORMATION:

NAME

CITIZEN WATCH CO LTD

COUNTRY

N/A

APPL-NO: JP55010459

APPL-DATE: January 31, 1980

INT-CL (IPC): H02K021/08;H02K037/00

ABSTRACT:

PURPOSE: To eliminate damages of a rotor magnet and improve the dimensional accuracy thereof by the use of a cylindrical rotor magnet that is pressed into a rotor seat and secured tight therein and then is exposed to a laser beam for a shaft hole into which a rotor shaft is inserted under pressure.

CONSTITUTION: An unfinished cylindrical rotor magnet 1 is pressed into a metallic rotor seat 2 and a centripetal force is supplied through a chuck 5 etc. to securely support the seat 2. A laser beam 6 is directed at the central part of the rotor magnet 1 and a hole is burnt through for a shaft. A blast of such gasses as Freon may be directed at the spot of laser application to take heat away. A rotor shaft 3 is then pushed into the shaft hole to form a rotor. The chuck 5 not in direct contact with the rotor magnet 1, the rotor magnet is protected from damages and the dimensional accuracy thereof is improved.

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CLIPPEDIMAGE= JP354099473A

PAT-NO: JP354099473A

DOCUMENT-IDENTIFIER: JP 54099473 A

TITLE: ROTOR STRUCTURE OF STEP MOTOR FOR WATCHES

PUBN-DATE: August 6, 1979

INVENTOR-INFORMATION:

NAME

NOMURA, HIRONORI

KOYANAGI, MASA

MAFUNE, MASAO

ASSIGNEE-INFORMATION:

NAME

CITIZEN WATCH CO LTD

COUNTRY

N/A

APPL-NO: JP53003082

APPL-DATE: January 14, 1978

INT-CL (IPC): G04C015/00;H02K015/02

US-CL-CURRENT: 368/160

ABSTRACT:

PURPOSE: To inexpensively obtain a rotor of light weightness and small moment of inertia by inserting a shaft into a hole opened in the rotor of rare earth metal compound magnet which is brittle and is poor in workability and directly fastening both by means of an adhesive agent mixed with reinforcing material composed of non-magnetic material.

CONSTITUTION: A rotor shaft 73 is positioned and set to a jig 77 and a sheet material 74 of high polymer material is forced onto the rotor shaft 73. On the other hand, a shaft hole is opened by laser machining in a rotor 71 composed of a rare earth metal compound cobalt magnet which is brittle and is poor in workability. Said hole is inserted onto the rotor shaft 73. Particles such as

of non-magnetic metal fibers, ceramics, glass fibers, etc. are injected as reinforcing materials into the spacing between the shaft 73 and the hole of the magnet 71 and further a fixed volume of an adhesive agent 75 is injected to infiltrate the spacing, thus the magnet 71 and shaft 73 are reinforced and bonded by the effect of the reinforcing agent 76.

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CLIPPEDIMAGE= JP354119607A

PAT-NO: JP354119607A

DOCUMENT-IDENTIFIER: JP 54119607 A

TITLE: ROTOR STRUCTURE OF STEP MOTOR FOR TIMEPIECE

PUBN-DATE: September 17, 1979

INVENTOR-INFORMATION:

NAME

MIYAKE, KENJI

NOMURA, HIRONORI

ASSIGNEE-INFORMATION:

NAME

CITIZEN WATCH CO LTD

COUNTRY

N/A

APPL-NO: JP53026227

APPL-DATE: March 8, 1978

INT-CL (IPC): H02K021/08;H02K015/02

US-CL-CURRENT: 29/598

ABSTRACT:

PURPOSE: To reduce the weight and size, by providing a tapered center hole through a rotor magnet made of an intermetallic compound of rare earth element and inserting a rotary shaft into the hole and putting a bonding agent in the hole to couple the rotor magnet to the shaft.

CONSTITUTION: The tapered center hole 81a of 0.2 to 0.5 mm in diameter extends through the rotor magnet 81, which is made of the intermetallic compound of rare earth element and whose surface is reinforced by impregnating a high-molecular material 82. The rotary shaft 83 is inserted into the tapered center hole 81a and a seal sheet 84. The bonding agent 85 is put in the center hole, thereby coupling the rotor magnet 81 to the rotary shaft 83. Thus, a high-performance compact rotor of low weight and small moment of

inertia for a
step motor can be manufactured from the high-performance
rare-earth/cobalt
magnet of high brittleness and low machinability.

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CLIPPEDIMAGE= JP407312859A

PAT-NO: JP407312859A

DOCUMENT-IDENTIFIER: JP 07312859 A

TITLE: ROTOR OF ELECTRIC CLOCK

PUBN-DATE: November 28, 1995

INVENTOR-INFORMATION:

NAME

SATO, KOICHI

YOSHIKAWA, KAZUHIKO

KAMIYAMA, FUMIO

MIYAUCHI, HIDEHARU

HIRAI, YOSHIRO

ASSIGNEE-INFORMATION:

NAME

CITIZEN WATCH CO LTD

COUNTRY

N/A

APPL-NO: JP06102793

APPL-DATE: May 17, 1994

INT-CL (IPC): H02K037/16;H02K001/27

ABSTRACT:

PURPOSE: To prevent solder from flowing to a pinion and to reduce cost without using a washer by providing a part with a large diameter at a location which is separated from a pinion by a specific distance and sealing the part with a large diameter and a magnet which is subjected to metal plating by soldering.

CONSTITUTION: A pinion 3a is formed in one piece in a rotor shaft 3 and at the same time a part 3b with a long diameter is formed in one piece at a location which is away from the pinion 3a by a specific distance (d). Then, the part 3b with a long diameter and a metal plating coating 2 are welded by solder 5 and a rotor magnet 1 and the rotor shaft 3 are sealed, thus preventing the solder 5 from flowing to the pinion 3a when performing soldering even

without using a
washer and hence constituting the rotor of an electronic clock with
two members
of the rotor shaft 3 and the rotor magnet 1. Also, a process for
press-fitting
the rotor shaft 3 into the washer can be saved, thus obtaining an
inexpensive
rotor.

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CLIPPEDIMAGE= JP410271724A

PAT-NO: JP410271724A

DOCUMENT-IDENTIFIER: JP 10271724 A

TITLE: ROTOR FOR ELECTRONIC CLOCK AND ITS MANUFACTURE

PUBN-DATE: October 9, 1998

INVENTOR-INFORMATION:

NAME

IKEDA, HIROSHI

✕ SATOU, ATSUSHI

SAKAKIBARA, YASUSUKE

HASHIMOTO, HIDETAKE

SASHITA, EIKICHI

MIYAUCHI, HIDEHARU

ASSIGNEE-INFORMATION:

NAME

CITIZEN WATCH CO LTD

COUNTRY

N/A

APPL-NO: JP09076857

APPL-DATE: March 28, 1997

INT-CL (IPC): H02K001/27;H02K001/28 ;H02K015/03

ABSTRACT:

PROBLEM TO BE SOLVED: To prevent the manufacturing machine of a rotor from being stopped due to a coating material leaked to the external, by providing in the hollow portion of a rotor magnet a closed space portion surrounded by a rotor shaft and the coating material applied to the inner peripheral surface of the rotor magnet.

SOLUTION: A rotor magnet 1 is a cylinder having a hollow portion in its center portion. Also, a solder plating layer 5 is formed on the inner peripheral surface of a rotor magnet 1, i.e., on the joining portion of the rotor magnet 1 to a rotor shaft 3. Further, in the hollow portion of the rotor magnet 1, there is provided with a closed space portion surrounded by the

rotor shaft 3
and a coating material. That is, the space of a receiving portion
7 for
receiving the chipped off coating material is provided. As a
result,
preventing the coating material chipped off in the hollow portion
of the rotor
magnet 1 when squeezing jointly the rotor shaft 3 into the rotor
magnet 1 from
leaking out of the inside of the hollow portion of the rotor magnet
1 to the
external, it is accumulated in the receiving portion 7 for
receiving chipped
off coating material to prevent the manufacturing machine of a
rotor from being
stopped due to its being entrapped in the machine.

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